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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/718,636	11/24/2003	Yale Zhang	H310719US	9139
28079	7590	06/09/2005	EXAMINER	
GOWLING, LAFLEUR HENDERSON LLP SUITE 560, 120 KING STREET WEST PO BOX 1045, LCD 1 HAMILTON, ON L8N 3R4 CANADA			LAU, TUNG S	
			ART UNIT	PAPER NUMBER
			2863	

DATE MAILED: 06/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/718,636

Applicant(s)

ZHANG ET AL.

Examiner

Tung S. Lau

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 November 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 9-19 is/are rejected.
- 7) ☒ Claim(s) 2-8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date See office action.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### **Information Disclosure Statement**

1. Information Disclosure Statement filed on 11-24-2003 and 6-1-2004 are acknowledged by the examiner; A copy of a signed PTO-1449 attached with this office action.

### ***Claim Objections***

2. Claims 15-19 are objected as the system claims are depending on a method claims, for this examination, the examiner assume claims 15-19 are a method claims, correction is required.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 9-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Vaculik (WO 00/05013).

Regarding claim 1:

Vaculik discloses a method for monitoring the operation of a continuous caster in a start-up casting mode in which molten metal is shaped in a continuous caster to form a solidifying strand product before the continuous caster reaches a predetermined minimum caster speed (page 1-2, lines 25-8), the method including the following steps: retrieving historical data consisting of multiple

historical observations of process variables for a plurality of continuous caster start-up operations (page 23, 3-8), the number of historical observations varying from one continuous caster start-up operation to another (page 8, lines 14-28); selecting a modeling set from said historical data to represent normal start-up operations of a continuous caster (page 10-12, lines 25-16); creating a synchronized data set of process trajectories from said modeling set in which the number of historical observations from each continuous caster start-up operation is scaled to correspond to a selected length of strand product (page 9-11, lines 30-26); performing a multi-way principal component analysis (MPCA) on said synchronized data set to calculate the value of principal components T and a loading matrix P for each continuous caster start-up operation to develop a multivariate statistical model of normal continuous caster start-up operations (page 15-17, lines 6- 20); computing test statistics selected from the group consisting of Squared Prediction Error (SPE) and Hotelling T' (HT) for each observation from said multivariate statistical model (page 18-19, lines 6-24, fig. 3)

Art Unit: 2863

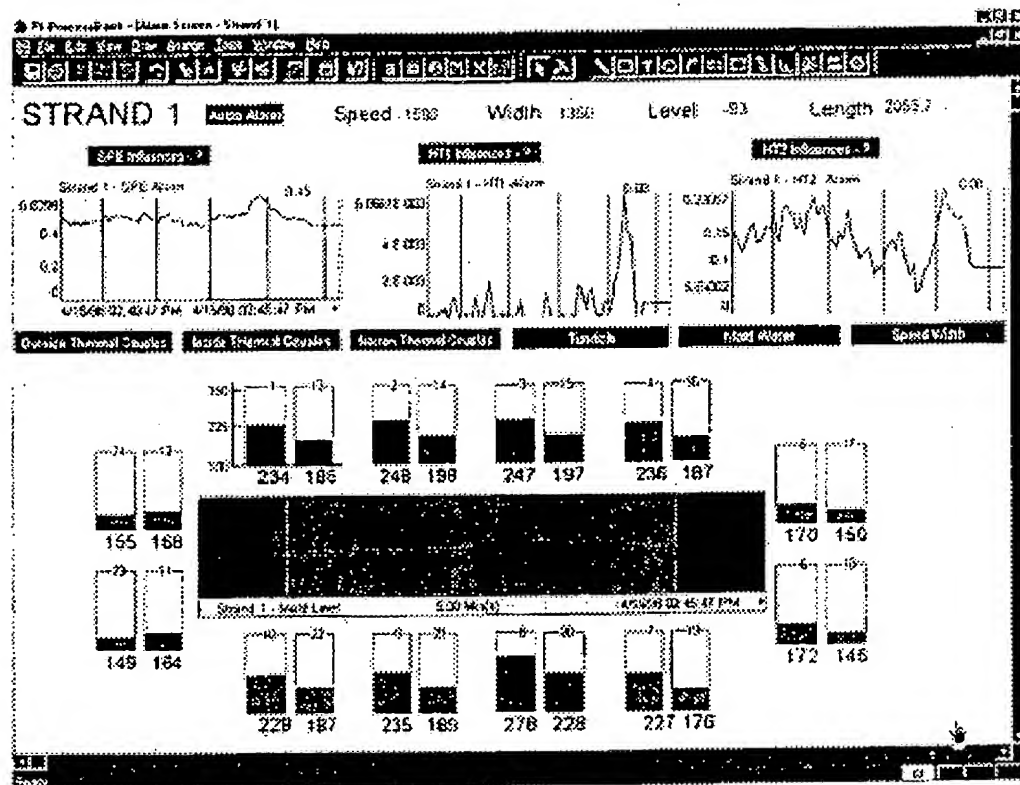


Fig 3

selecting control limits for said SPE and HT test statistics and their contributions;  
 acquiring on-line data consisting of multiple observations of said process  
 variables observed at an elapsed time  $t$  during a start-up operation of a  
 continuous caster (page 18-19, lines 6-24); predicting future process trajectories  
 for said on-line data for a start-up operation of the continuous caster producing  
 said selected length of strand product (fig. 2, unit 31-39, page 23-24, lines 28-5);

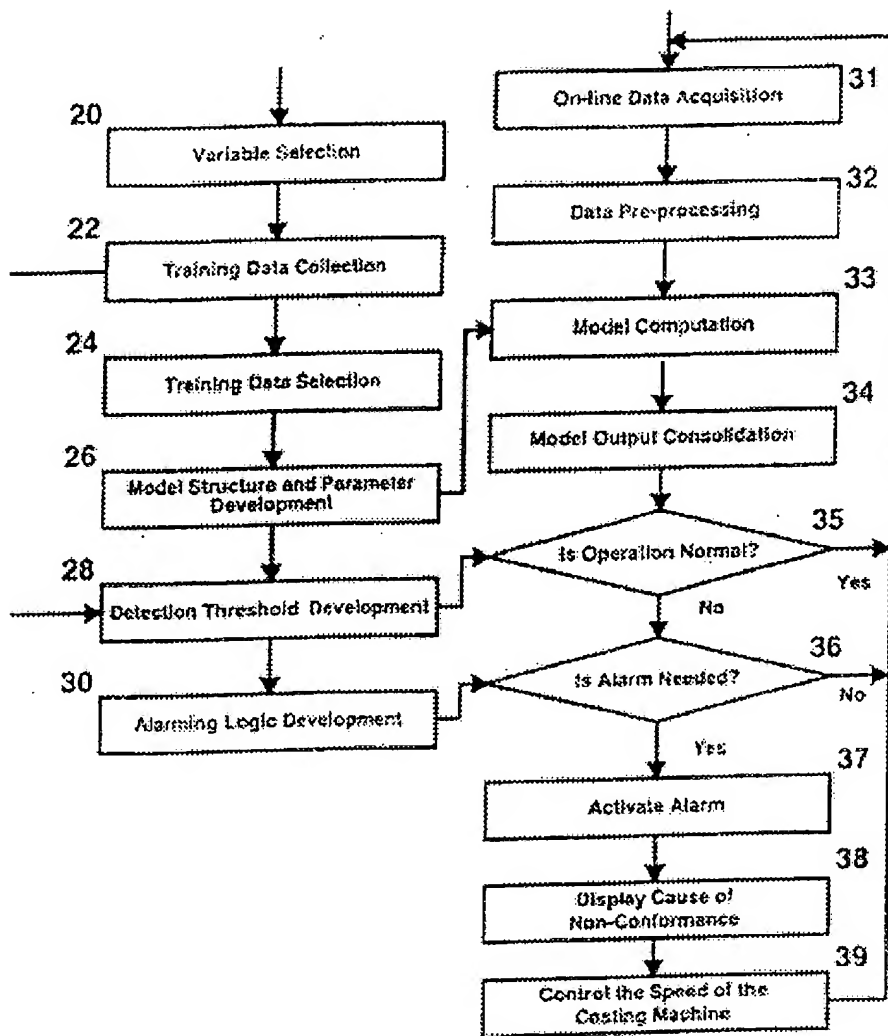


Fig 2

applying said multivariate statistical model 'to a matrix  $X_{new}$  of said future process trajectories to compute test statistics selected from the group consisting of Squared Prediction Error (SPE) and Hotelling T" (HT) (page 18-21, lines 6-8); comparing said test statistics computed from the matrix  $X_{new}$  to the said control limits ; and generating a detection signal, said detection signal being indicative of whether the continuous caster start-up operation is consistent with normal start-up operations in a continuous caster (page 23, lines 8-22).

Regarding claim 9, Vaculik discloses grade of metal and width (page 11, lines 2-14); Regarding claim 10, Vaculik discloses operation exceeds limit 3 consecutives sampling interval (page 12, lines 3-16); Regarding claim 11, Vaculik discloses behavior based on SPE and HT statistic (page 21-22, lines 14-21); Regarding claim 12, Vaculik discloses cause of abnormal behavior has the highest ratio (fig. 3); Regarding claim 13, Vaculik discloses SPE and HT are updated (fig. 3); Regarding claim 15, Vaculik discloses data communication in real time, MPCA analisys (page 23-24, lines 3-5), displaying SPE and HT data (fig. 3); Regarding claim 16, Vaculik discloses associated with width range (page 11, lines 17-24); Regarding claim 17, Vaculik discloses detect signal to display (fig. 3); Regarding claim 18, Vaculik discloses display screen (fig. 3); Regarding claim 19, Vaculik discloses product notification, speed, strand length (fig. 3).

***Allowable Subject Matter***

4. Claims 2-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitation of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: prior art fail to teach: regarding claim 2, start up speed is at least 0.1 m/s; regarding claim 4, comprising group from mold thermocouple readings, temperature differences

Art Unit: 2863

between pre-defined thermocouple pairs, stopper rod position, tundish car net weight, mold cooling water flows, temperature difference between inlet and outlet mold cooling water, casting speed, and calculated heat flux transferred through each mold face; regarding claim 5, based on non uniform scales; regarding claim 7, control limit are selected exclude 5% of casting operation at start-up; regarding claim 8, variable to SPE or HT are selected exclude 5% of casting operation.

Claim 3 is objected due to their dependency on claim 2.

Claim 6 is objected due to their dependency on claim 5.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tung S Lau whose telephone number is 571-272-2274. The examiner can normally be reached on M-F 9-5:30. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on 571-272-2269. The fax phone numbers for the organization where this application or proceeding is assigned is 703-872-9306



Art Unit: 2863

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TL

**BRYAN BUI**  
**PRIMARY EXAMINER**

*B. Bui*  
6/7/05